

Unit 5 - Trigonometry

L1(7.1) Congruent & Similar Triangles

Definitions:

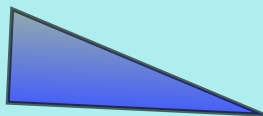
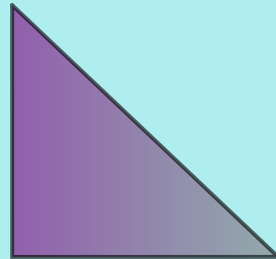
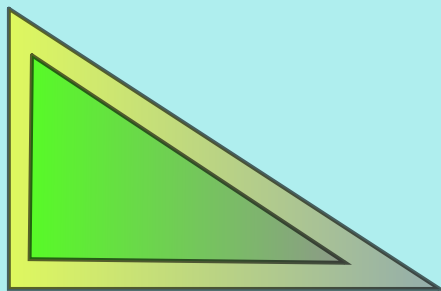
1. Ratio - a relationship between two quantities, usually expressed as a fraction.
2. Proportional - all ratios between corresponding sides are equal between two objects, and the ratio is called the scale factor.
3. Congruent - two objects are congruent if they have the same dimensions and shape (the scale factor is 1)

Proven if : SSS, SAS (angle contained) or ASA (side contained)

4. Similar - objects are proportional, but not congruent (the scale factor is not 1)

Proven if: SSS~ , SAS~ or AA~

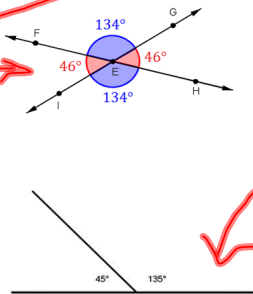
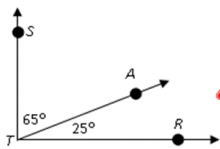
Which shapes are congruent? proportional?



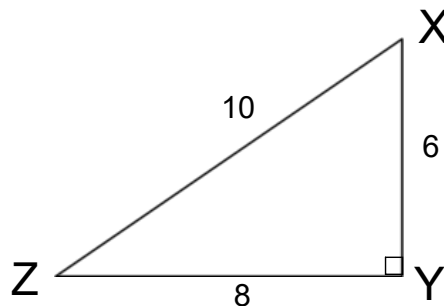
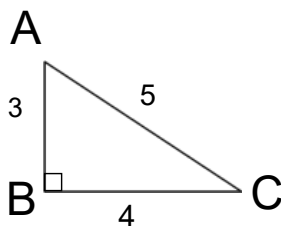
Parallel Line Theorems

Z pattern	F pattern	C pattern
Alternate angles are equal	Corresponding angles are equal	Co-interior angles add to 180°

Remember....

SAT - Supplementary Angle TheoremOAT - Opposite Angle TheoremCAT - Complimentary Angle TheoremEx.1 Are the triangles congruent? Similar? Neither?

(a)



Scale factor 2

Congruent: proven if SSS or SAS or ASA

Similar: proven if SSS or SAS or AA~

- look at ratios of corresponding sides

$$\frac{3}{6} = \frac{4}{8} = \frac{5}{10}$$

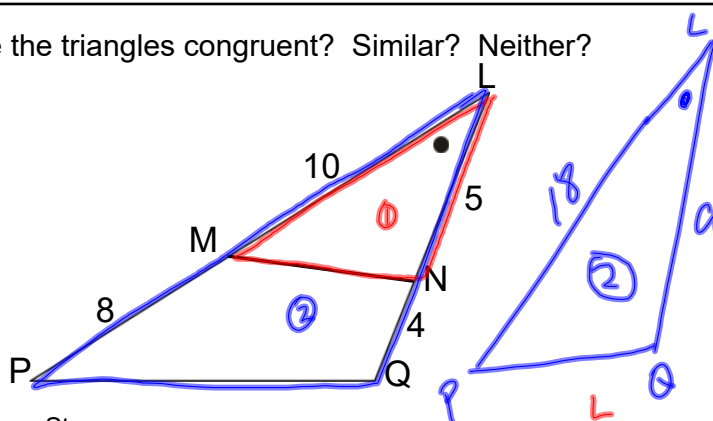
Reduce

$$\frac{6}{3} = \frac{8}{4} = \frac{10}{5}$$

$$2 = 2 = 2$$

Scale factor $\rightarrow \frac{1}{2} = \frac{1}{2} = \frac{1}{2}$ or

(b) Are the triangles congruent? Similar? Neither?



Steps:

- 1) Split into two triangles
- 2) Prove similar or congruent

$$\angle PLQ = \angle MLN$$

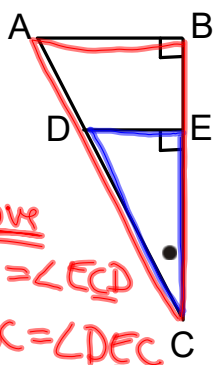
$$\frac{10}{18} = \frac{5}{9}$$

$$\frac{5}{9} = \frac{5}{9}$$

SAS ~

note: angle must be between two known sides
 $\therefore \triangle PLQ \sim \triangle MLN$

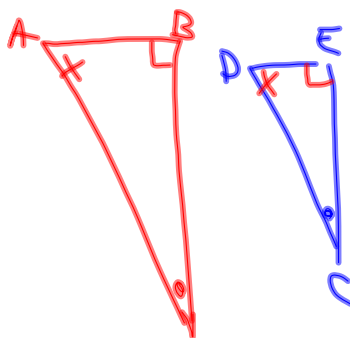
(c) Are the triangles congruent? Similar? Neither?



Steps:

- 1) Split into two triangles
- 2) Prove similar or congruent

Prove
 $\angle BCA = \angle ECD$
 $\angle ABC = \angle DEC$
 AA ~



\therefore all angles add up to 180°
 so $\angle A$ has to equal angle $\angle D$.
 \therefore the triangles are similar

~~SSS~~
~~SAS~~
 AA ~

Summary:

If $\triangle ABC$ is similar to $\triangle XYZ$,
we write:

$$\triangle ABC \sim \triangle XYZ$$

similar

* the order that we
write the vertices
is important

We can show similarity (or congruence) by:

(a) side-side-side similarity (SSS~)

(b) side-angle-side similarity (SAS~)

(c) angle-angle similarity (AA~)

prove it.

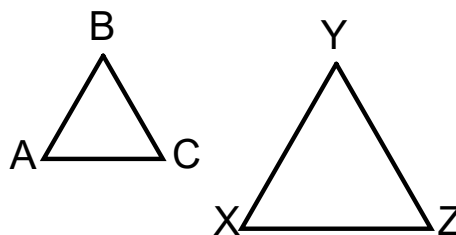
In similar triangles

- corresponding sides are proportional

(i.e., the ratios are equal)

- corresponding angles are equal.

Given $\triangle ABC \sim \triangle XYZ$



Sides: $\frac{AB}{XY} = \frac{BC}{YZ} = \frac{AC}{XZ}$

Angles: $\angle A = \angle X$
 $\angle B = \angle Y$
 $\angle C = \angle Z$

Ex.2 Determine the value of m & n.

Prove - similar
 $\angle E = \angle A$
 $\angle ACB = \angle ECD$

$\Delta ABC \sim \Delta DEC$
 by AA~

Steps:

- 1) Prove similar or congruent
- 2) Solve for unknown

$$\frac{n}{3} = \frac{6}{4}$$

$$n = \frac{18}{4}$$

$$n = \frac{9}{2}$$

$$n = 4.5$$

$$\frac{m}{5} = \frac{4}{6}$$

$$m = \frac{20}{6}$$

$$m = 3.33$$

Assigned Work:

Read p.374 - 378

Answer p.378 # 1, 2, 4ac, 5, 6, 7ab, 8cd, 13